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ABSTRACT

This issue is divided into three sections: (1) Activities in Britain; (2) Publications; and (3) Overseas and International Activities. Numerous topics of interest to secondary school science and mathematics educators pertaining to British education are presented. Included are reports on science education meetings, mathematics tests, science careers in industry, and evaluation of science materials. The overseas and international section is devoted to news items from Portugal, South Africa, Israel, and Australia. (BB)

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Science Education Newsletter

Issued by the
Education and Science Division
The British Council

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

SE 026 849

September 1978

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ACTIVITIES IN BRITAIN

1. IMPACT AND TAKE-UP PROJECT – AN ENQUIRY INTO THE IMPACT AND TAKE UP OF SCHOOLS COUNCIL FUNDED ACTIVITIES

First Interim Report to the Programme Committee of the Schools Council

This project aims to investigate the impact and subsequent use of Schools Council projects in primary and secondary schools. Surveys are being carried out at both levels by a team based at Sussex University, using national samples of schools. This interim report is a preliminary analysis of the first sixteen months of the project work in the primary sector. The result and figures given are based on two parallel surveys – one on a random sample of 107 primary schools visited during the summer term of 1977, the other on a postal survey of a further 479 primary schools.

The report centres around teachers' familiarity with and use of the ideas and materials from 44 different projects aimed at primary and middle school teachers. It offers a summary of results for each of the sixteen Nuffield and Schools Council projects listed in the survey, and details of information sources used by teachers and head teachers in the sample schools. The report also explores the possibility of educational broadcasting as an information medium, but it appears possible that many teachers are influenced by Schools Council projects without being aware of their source.

The survey reveals that the Schools Council projects show a disconcerting lack of impact at primary level. Whilst 80–85% of primary schools are using at least one of the sixteen listed Schools Council and Nuffield projects, only eight projects are known by over 40% of primary teachers and a further 10 are known by less than 20% of primary head teachers. Of the 25 publications listed only 3 were known by more than 50% of head teachers and less than 4% of primary teachers were familiar with any one of the publications.

The report points out that choice cannot be exercised by teachers unless they know what is available to them. 90% of the teachers involved in the survey had not had any contact with over half the listed projects or their materials. Qualitative judgement of projects cannot be made without substantial contact with a project, its materials and its ideas. It would seem that the levels of information required are not being reached. Furthermore, levels of familiarity with the majority of publications were very low which would indicate that information on the Schools Council projects is not reaching its intended audience.

The appendices contain the questionnaires and statistical data on which the report is based, with appropriate explanations where necessary.

2. KENT/SCHOOLS COUNCIL MATHEMATICS PROJECT (KMP)

The Kent Mathematics Project has been developed in schools over a ten-year period (SEN 35.4.3). The material is now being published. Each level consists of a bank of materials consisting of worksheets, booklets, and tapes, a short test for each task, a hierarical flowchart for the tasks, matrix cards, record cards, teacher's notes and text answers. Teachers can select a mathematical course, including both traditional and modern mathematics, tailored to suit the needs of each individual pupil. The material is designed for mixed-ability classes, with a wide ability range, and there is special provision for slow learners.

The material has been subject to rigorous testing with many thousands of pupils and several hundred teachers. The material for each level is adequate for over fifty pupils.

Publication dates
Level 1–2 (approx. ages 9–10) September 1978
Level 3–4 (approx. ages 11–12) February 1979
Level 5–8 (approx. ages 13–16) 1980
Level L1–L3 (material for very slow learners, 11–16) 1979
Price approximately £58 per level.
Most items will be available for separate sale
Further information from Ward Lock Educational, 116 Baker Street, London W1M 2BB

3. TESTS OF ATTAINMENT IN MATHEMATICS IN SCHOOLS (SEN 21.16)

The Tests of Attainment in Mathematics in Schools (TAMS) project operated from 1972 to 1976. It was intended, initially, to establish 2 item banks for use in a national survey designed to monitor pupils' attainments in the subject field of mathematics, for pupils in the 10–11 and 14–15 year age bands. The questions in the banks at first were pencil-and-paper types. Later, it was thought that practical mathematical activity should also be assessed, so the project was expanded to include a study of appropriate materials and methods. Later still there was a further extension of the modes of testing, with the purpose of assessing creativity in mathematics, attitudes towards mathematics and an extension of the practical mathematics assessment materials.

The current importance of TAMS is that its experience has been used as the basis for the mathematics component of the work of the Assessment of Performance Unit (APU) (SEN 36.2). Reports of the work of TAMS are available in the following 2 publications from the National Foundation for Educational Research:

Tests of Attainment in Mathematics in Schools: Monitoring Feasibility Study. R. Sumner, £4.50.

This report describes the developments of the first 2 item banks, together with an account of an investigation of the assessment of practical mathematics.

Tests of Attainment in Mathematics in Schools: Continuation of Monitoring Feasibility Study. R. Sumner and I. Kyles, £2.50

This report includes the wider modes of testing used in the project, concerned with attitudes, 3D visualisation, practical performance, conceptualisation, generalisation and inventiveness. Sample items used are included.

NFER Publishing Company Ltd, Darville House, 2 Oxford Road East, Windsor, Berks SL4 1DF.

4. POLYMATHS (SEN 34.9)

Polymaths is self-study material designed to give a second start in mathematics for mature students. It has been used as a course text at a variety of tertiary institutions as preparation for entry to degree courses. Now, however, responsibility for the use of Polymaths as a basic course text has been undertaken by the Institute of Mathematics and its Applications (IMA).

Before giving approval for a course, the IMA committee concerned need to be satisfied that the establishment proposing to offer it has appropriately qualified teaching staff and has made satisfactory arrangements for assessment. In this way, standards of such courses are set, and entry of successful candidates to degree and HND or certificate courses is facilitated. It is expected that within a year or so about 50 centres, some of them overseas, will be offering a course based on Polymaths.

Courses aim to inculcate interest and confidence in mathematics, in which its applications predominate. Students must be at least 20 years old on entry, and prepared for a full academic year of intensive study. Much of the work is done alone, with individual tutorials. The Council for National Academic Awards (CNAA) and the Open University are among bodies accepting success in the IMA Polymaths Diploma as qualification for entry to degree courses.

Further information may be obtained from:

Institute of Mathematics and its Applications
Maitland House
Warrior Square
Southend-on-Sea
SS1 2JY

5. MATHEMATICS FOR THE LESS ABLE, 11–14

This is the title of a newsletter published regularly by the Scottish Curriculum Development Service, Dundee Centre. The Centre was previously known as the Scottish Centre for Mathematics, Science and Technical Education (see item 6).

As the title suggests, the Newsletter is concerned with the mathematics education of children in the early years of secondary education, who are at the lower end of the ability range. The kind of questions it seeks to consider are:

Do mathematics and remedial teachers co-operate effectively?

Should l.a. pupils be taught by mathematics or remedial teachers, or both?

Could more be done in the primary school to detect and correct weaknesses?

Could more be done in the first year of secondary education to detect and correct weaknesses?

Would closer liaison between primary and secondary schools help?

Do pre-service training courses adequately prepare students to deal with l.a. pupils?

Are in-service courses adequate?

Which teaching methods are most effective?

What should the content of the mathematics course for l.a. pupils consist of?

Are the books and apparatus adequate?

How can teachers be encouraged to make use of concrete material and apparatus?

While the Newsletter deals specifically with the situation in Scotland, much of its contents would be of interest to those concerned with this problem in any educational system where a high proportion of children receive secondary education.

The Newsletter is edited by Mr Roy Hollands, of the Dundee College of Education. Further information about the Newsletter and its availability may be obtained from Mr J. A. R. Hughes, Director, Scottish Curriculum Development Service, Dundee Centre, College of Education, Gardyne Road, Broughty Ferry, Dundee, DD5 1NY.

6. SCOTTISH CENTRE FOR MATHEMATICS, SCIENCE AND TECHNICAL EDUCATION

This centre is one of four curriculum development centres in Scotland each of which is concerned with a particular area of the curriculum. A recent change in the organisation of the national structure for curriculum development has resulted in a change of name for this centre, and will lead in the future to a widening of its activities.

Briefly, the Consultative Committee on the Curriculum (CCC) has created two advisory bodies, the Committee on Primary Education (COPE) and the Committee on Secondary Education (COSE), and a third, the Development Service Committee. The latter is responsible for the management of the four centres in line with the priorities determined by COSE.

The centre previously known as the Scottish Centre for Mathematics, Science and Technical Education is now to be called the Dundee Centre of the Scottish Curriculum Development Service. It will continue to provide the same service for teachers as before but its field of activity may be broadened to include aspects of secondary education not previously covered by any of the centres.

Work is continuing on the following projects at the Centre:

Mathematics, syllabus B (for Scottish 'O' grade)

Mathematics for general education

Mathematics for the less able

Mathematics curriculum and assessment group

Statistics

Science in S1 and S2 (secondary years 1 and 2)

Modules in Science for S3 and S4

Review of present syllabuses ('O' and 'H' grades)

Modular courses in technical education for S1 and S2

Integrated craftwork in S3, S4 and S5

Engineering Science – 'O' grade

Technical drawing

7. EARLY MATHEMATICAL EXPERIENCES (SEN 23.11)

The materials for this Schools Council Project have now been published.

The first aim of the project was to identify and classify young childrens' play experiences, and to relate these experiences to the theoretical development of early mathematical concepts.

The second aim was to produce guidance for teachers to help them stimulate the development of mathematical concepts with young children. "Teachers" here means those responsible for nursery and infant classes, and play-group leaders. The emphasis is on providing an environment of activities in which fundamental concepts can be built up and refined, rather than early arithmetic "learned". Language is seen as central to the young child's growing understanding, and the topic booklets are full of delightful and illuminating extracts of conversations between children, sometimes with an adult, illustrating the many facets of early mathematical development.

The core of the project consists of a slip-case containing a general guide, and six topic booklets each covering two themes:

Space and Shape; Comparisons

Towards Number Apparatus; Toys and Games

The Passage of Time; Rhymes and Stories

Home Corner; The Family

Water; Raw Materials

Outdoor Activities; The Environment

Each theme has a short illustrated introduction highlighting the concepts covered and explaining the techniques suggested. An exposition of "possible developments" follows, with extensive examples of fruitful indoor and out-door activities. Practical advice is given on appropriate materials and equipment and its use with the children. New mathematical vocabulary likely to be used is listed at the end of each group of activities. Finally, the teacher's role in developing each theme is discussed.

The project has also produced a set of 30 slides with notes, and a one-hour video-tape suitable for use with Philips machines. However, the pack of booklets is complete in itself, and those who are concerned with the pre-school education of children up to the age of five or six would find much of value in them.

Early Mathematical Experiences: pack of seven booklets in slip-case. Addison-Wesly Publishers Limited, West End House, 11 Hills Place, London, W1R 2LR. 201 13322 9. £6.50

8. CHELSEA COLLEGE BSc IN MATHEMATICS AND PHILOSOPHY OF MATHEMATICS

Chelsea College, University of London, has announced a new course for BSc Honours in Mathematics and Philosophy of Mathematics, designed to integrate mathematics and philosophy to form an organic whole. The course will be offered for the first time starting in October 1978. Further information from the Admissions Tutor, Chelsea College, Manresa Road, London SW3 6LX.

9. THE DIPLOMA IN MATHEMATICAL EDUCATION OF THE MATHEMATICAL ASSOCIATION (SEN 34.12, 35.9)

The following 12 colleges were the first to be given approval by the Diploma Board to start 2 year part-time courses for the Diploma in 1978 or 1979:

Westminster College, Oxford
Matlock College
Bishop Grossteste College, Lincoln
Rolle College, Exmouth
West London Institute of Higher Education
Hamilton College, Cambridge
Derby Lonsdale College
St Mark and St John College, Plymouth
Roehampton Institute of Higher Education (Southlands College)
Keswick Hall College, Norwich
Milton Keynes College of Education
Hertfordshire College of Higher Education

It is expected that more colleges will be given approval very shortly. Enquiries should be made to individual colleges.

10. PROGRAMMES ON MATHEMATICS FOR SCIENTISTS AND TECHNOLOGISTS

A series of programmed learning texts has been developed by the Centre for Advancement of Mathematical Education in Technology (CAMET) at Loughborough University of Technology. They were used first by students of science and engineering who worked through them at their own pace, answering questions and solving whole or part problems. The texts have since been used by other students e.g. in the Education and Mathematics course for intending teachers, and tested in a number of tertiary institutions. The material is explained in more detail than is usual especially at points where difficulty is often experienced.

The consultant editor is the Director of CAMET, Professor A. C. Bajpai, and the publishers are John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex, DO19 1OD' Titles available in the series are:

Fortran and Algol £4.35

Mathematics for Engineers and Scientists vols 1 and 2 £4.35 £5.00

Numerical methods for engineers and scientists £4.95

Statistical methods for engineers and scientists £5.85

11. COMPUTERS IN THE CURRICULUM – A SCHOOLS COUNCIL PROJECT

This project was et up in 1973, to examine ways in which the use of a computer could help assist the teaching of particular topics in subjects other than mathematics. Biology, chemistry, physics, geography and economics have been examined. Work has concentrated on all ability ranges in the fifth and sixth forms of secondary schools (15–19).

The project has been able to work with teachers from a range of disciplines in investigations into the role of the computer as a learning resource in secondary schools. The outcomes of these investigations have been:

1. units of computer-assisted learning (CAL) material for use by pupils; and

2. analyses of the value of computer-based materials within various disciplines.

In addition to tangible written material and computer programme, teachers involved with the project have accumulated considerable appreciation and expertise in CAL and have been able to pass on some of this through workshops, courses and seminars held throughout the country.

Materials

Distributor: Edward Arnold, 25 Hill Street, London W1X 8LL.

The materials have been designed to integrate into existing curricula at sixth form and pre-sixth form level. A number in the former category should also prove useful in colleges whilst a number of the latter have tried to tackle certain numeric difficulties often faced by lower ability pupils. At all levels the aim has been to provide pupils with new opportunities for learning through investigations guided by their teachers. There is no need for either pupil or teacher to be familiar with computing and the units are not designed to teach this.

The following are now being published:

Physics

Capacitor Discharge; Photoelectric Effect; Gaseous Diffusion; Mass Spectrometry; Radio-active Decay; Planetary Motion; Gravitational Fields. Also Home-heating – separate unit suitable for the younger age range.

Biology

Human Energy Requirements; Transpiration; Heredity; Statistics for Biologists; Pond Ecology; Predator-Prey Relationships; Countercurrent Systems.

These will be available soon:

Chemistry

Chemical Equilibrium; Rates of Reaction; Gas Chromatography; Electrochemical Cells; Lattice Energy; Contact Process; Element Game.

Geography

Drainage Basin Morphometry; Industrial Location; Farm Management; Statistics for Geographers; Human Population Growth; SE Railway Game; Joint-stock Trading Game.

Economics

Theory of the Firm; Price Stabilisation; Price Fluctuation; Elasticity of Demand; International Trade; Multiplier; Monetary Policy; Banking; Fiscal Policy.

A teacher will be able to buy a loose-leaf pack of material in his or her own subject area. Each pack will contain (in about 200 pages) notes on each of the topics covered for the teacher's own use, and student material which will be included in one or other of 2 forms. The short form, appropriate for some of the topics, comprises a series of leaflets for students to be used in conjunction with lessons or laboratory work of the usual kind. The long form has been used for other topics where the content is best covered by a small booklet. A single copy of all this material is included in the packs and it has been agreed that teachers may copy the student pages for their own use using the reprographic facilities which are available to them. It will also be possible for teachers to purchase additional copies of the long-form Student Notes for class use.

Extension of Project

The project, which was originally planned to finish in 1977, has been extended to 1980. During this extension the project's work will include an examination of the role of CAL (Computer Assisted Learning) in improving numeracy; a dissemination programme; the production of further materials; and an investigation into the impact of the use of CAL in the curriculum.

Further information may be obtained from the distributors, or from the Project Director, R E J Lewis, Educational Computing Section, Chelsea College, University of London, Pulton Place, London SW6 5PR.

12. STUDIES IN DECISION MAKING IN SCIENCE EDUCATION – AN ASE/SCHOOLS COUNCIL PROJECT

The Association for Science Education has received funding from the Schools Council for an important project which will investigate the ways in which science teaching in schools is responding, not only to the many recent developments in the science curriculum, but also to the need for greater accountability and for an awareness of the requirements of industry.

The aim of the project is to produce a series of analytical case studies. These will illustrate various approaches to the organisation of science teaching in schools in England and Wales and describe the factors which influence practising science teachers when faced with selecting the content of their science courses. The present need for greater accountability and indications of falling pupil numbers have become important factors, not only for those involved in future curriculum development, but also for science teachers who have to make the working decisions. By looking at the effects of these decisions on the science programmes devised by a sample of schools, it is hoped that guidance can be given to science teachers, advisers and head teachers, on the probable effects of particular decisions on the science teaching in their own schools.

The studies, to be undertaken by teachers seconded from the classroom, will be a continuation of a pilot project conducted from 1972–1976.

The project staff are:

Director: Mr Richard Hull, School of Education, University of Nottingham

Project Officers: Mr Harvey Adams, Oaklands School, Middlesbrough, Cleveland

Mrs Jan Craig, Wreake Valley Community College, Syston, Leicestershire.

13. ASSOCIATION FOR SCIENCE EDUCATION ANNUAL MEETING 1979

The annual meeting will be held at the University of Reading from Tuesday January 2nd to Friday January 5th

The meeting will include symposia, lectures, visits, exhibitions, workshops, films, members' papers and social events.

There will be a programme of lectures by members of the host University as well as the Macmillan Education lecture and the SCSST Technology lecture given by the Director of the National Computing Centre.

Exhibitions of publishers' and manufacturers' materials, and members' original work will be staged as usual. One manufacturer is offering a workshop on "instrumentation in chemistry" with opportunity to perform a number of experiments with the conductivity meter, pH meter, colorimeter, polarimeter and radial chromatography kit.

The British Council is organising a half-day symposium on "Appropriate Science and Technology". There will be a supporting exhibition of materials from a number of other countries. The subjects of the other symposia are:

Your influence on Schools' Science Broadcasting

LAMP Project	Science/Maths interface
Primary Science	The School Science Technician
Science in a core curriculum, 11–16	Geology in the secondary school curriculum
Why do practical work?	Sixth form curriculum development proposals
	Is science too difficult?

Members travelling by British Rail are offered a 30% reduction in fares. Application forms and further information are available from:

Annual Meeting Secretary, ASE,
College Lane,
Hatfield, Herts AL10 9AA

14. ASSOCIATION FOR SCIENCE EDUCATION AWARD SCHEME 1979

The theme for this award is School/Industry links and Science Teaching. Entries are welcomed from any person or group concerned with teaching science in the 11–16 year age range. The entry should be typed, not more than 5000 words in length, and might take the form of:

(a) an account of a school science/industry link and its implications, the science curriculum of the school, or

(b) an account of a specific activity which has arisen from a more general school/industry link.

It should be received by 31st March 1979.

The awards offered are of £150, £75 and £25.

Further details, including the rules may be obtained from the ASE, College Lane, Hatfield, Herts AL10 9AA.

15. SCIENCE AND TECHNOLOGY REGIONAL ORGANISATIONS (SATROS)

There are now 19 of these organisations forming a national network, under the auspices of the Standing Conference on Schools' Science and Technology (SCSST). They exist 'to encourage a modern approach to science and technology in schools, to improve understanding between schools and industry, and to provide practical help to teachers'.

Help is obtained from industrial concerns, local government, careers officer, professional bodies, institutions of further and higher education, as well as from teachers. Funds are received from a number of sources; from Local Education Authorities, and Universities, and from industry and charitable trusts.

The annual report of the SCSST includes an account of their activities from each one of them and a selection is listed below:

1. development of modular courses in technology
2. lecture service in schools
3. resources centre to help teachers make industrial contacts
4. provision of workshops for wood, metal, plastics, jewellery/silver smithing, and control engineering/electronics
5. helping teachers to use the Understanding Industrial Society scheme
6. establishing a liaison between representatives of local industry, and teachers in primary schools
7. recycling of surplus materials
8. compilation of a regional schools/industry link directory
9. planning of seminar supported exhibitions on 'Schools, Technology and Manufacturing Industries'
10. design and manufacture of aids for the disabled, test equipment for schools, and teaching aids
11. running of a Mathematics Enrichment Club for especially gifted sixth-formers
12. working parties on examination syllabuses in technical subjects
13. reports on 'perceptions and attitudes towards careers in industry', and 'numeracy and school leavers'
14. annual competition for science and technical projects
15. a schedule of attributes desirable in those entering industry (see item 16).

16. CAREERS IN INDUSTRY – WHAT ATTRIBUTES ARE NEEDED?

Employers frequently express a wish that school leavers might be 'more self reliant' and have 'more initiative'. Two participants, J. Eglen and R. F. Morgan of the 'Schools and Industry Conference', Preston 1977, have further identified the needs of employers. They compiled a list of personal capabilities, skills and other characteristics on the basis of their own understanding, sent it to people in schools and industry for comment, and then revised it. The revised list was submitted to a panel drawn from industry and education, and the final schedule prepared.

The schedule is presented in 6 sections which are further subdivided. They are: practical abilities, attitudes, communication skills, social skills, thinking skills and powers of perseverence. A total of 69 attributes is listed.

The authors recommend that the list be examined to determine those which can be developed by teaching, and existing programmes and future curriculum developments be adapted with these objectives in view. The list might also be used to prepare pupil profiles, of value to employers.

The "schedule of attributes desirable in school leavers intending to enter careers in industry" is published by:

STEEL,
Preston Polytechnic,
Chorley Campus,
Union Street,
Chorley, Lancs.

17. STUDENT TEACHERS PREPARED FOR MIXED ABILITY TEACHING IN SCIENCE

A four year Teacher Education Project at the Universities of Nottingham and Leicester is investigating training methods and materials for mixed ability teaching. During 1977 a workbook for students to use on teaching practice was produced, and used for the first time this spring. The workbook contains eight exercises each focussing on different aspects of mixed ability teaching.

Focus 1 requires observation of the different skills used by teachers in explaining and questioning, class and group teaching, individual work and resource use.

Focus 2 concentrates on the resources and their preparation, organisation, use and availability. It includes a readability test.

Focus 3 Students worked closely each with an individual pupil noting strengths, weaknesses, and relationship.

Focus 4 requires work with one small group, devising tasks to involve each child.

Focus 5 is on one of the more gifted pupils needing extension work.

Focus 6 is on a slow-learner whose problem has to be identified before learning material can be produced.

Focus 7 concerns the recording of progress of each child in the class.

Focus 8 analyses the students understanding of the methods he is using when teaching the whole class.

The trial booklet will be revised in the light of this year's experience. It was found to demand too much of students for the one term for which used. Meanwhile copies are available from T. Kerry, School of Education, Nottingham University NG7 2RD (price £0.80).

18. Evaluation for New Scottish Integrated Science Materials

These materials which have recently been published (see SEN 35: 13.3) were prepared, tested and edited from 1974–77. During that time they were evaluated in over 60 schools with the help of 200 teachers.

Comments from the teachers on each section were collected from questionnaires and from the return of one set of materials annotated with their comments and suggestions after use.

The level of achievement of specific objectives was investigated with a set of validated questions appropriate for the wide ability range, for each section. The general objectives were investigated by asking the teachers to observe and rate the behaviour of a sample of their pupils.

The difficulties of implementing the course in different school and classroom situations were recorded through discussions with teachers, observation and from questionnaires.

Most of the material has existed in three versions, and the changes in language and format has been monitored.

An account of these procedures is to be found in "Evaluation of the new materials for Scottish Integrated Science" by S. H. Kellington and A. C. Mitchell, 1978, published by Heinemann Educational Books. £2.95

PUBLICATIONS

19.1 Mathematics Across the Curriculum by J. Ling published by Blackie, for the Schools Council, 1978, at £3.25.

This first publication of the Schools Council Project 'Mathematics Curriculum: A Critical Review' is in the nature of a survey of aspects which teachers should consider in appraising the great range of literature and teaching apparatus now available for school mathematics. It considers such general questions as 'What makes a topic important?' 'What makes a topic difficult' 'What methods and examples are appropriate in teaching a given topic at a given level?'

Mathematics is related to other school subjects, including less obvious ones such as domestic science, economics and educational dance. Many textbook and examination examples are critically analysed, to assess the particular pre-requisite knowledge and mathematical skills which they require. The book is valuable as giving a broad perspective to the work of the mathematics teacher.

19.2 **Geometry** by W. W. Willson, published by Blackie, for the Schools Council, 1978 at £3.75.

This splendid book is by one of the leading exponents of school geometry today. Five major approaches to the teaching of geometry in schools are identified and discussed. Much of the book concerns geometrical transformations, which are shown to be basic to fundamental ideas of 'traditional' geometry. The book is full of illuminating illustrations and examples and will be of particular value to teachers who find themselves slightly uncertain as to the appropriate depth to which a transformation approach to geometry teaching should be taken.

19.3 **From Graphs to Calculus** by H. Neill and H. Schuard, published by Blackie, for the Schools Council, 1978 at £3.45.

Rather unexpectedly, this book is mainly concerned with the pre-O-level course, in which the authors consider that calculus should have a rightful place. The approach is from graphs through a consideration of the definite integral. There is a useful historical survey of the development of calculus.

19.4 **Counting and Configurations** by Charles Cook and Ian Anderson, published by Blackie, for the Schools Council, 1978 at £1.50.

This book provides a unified account of combinatorics, a branch of mathematics which is often regarded as fragmented. It covers the whole area of finite mathematics, in which the questions "Is this configuration possible?" and "In how many ways?" are asked. These lead, in the curriculum for 11–16 year olds, to counting investigations, recreational mathematics, the binomial theorem and probability. The ideas are both accessible at this level and mathematically important, and provide opportunities for work with pupils of all abilities. The book is full of interesting examples, the solutions to which are discussed in a particularly clear manner.

19.5 **Number** by John Hunter and Martyn Cundy published by Blackie, for the Schools Council 1978 at £3.00.

Together with "Geometry" this volume may be regarded as one of the Project's two key books. Number work has always been at the heart of the school mathematics curriculum, but in recent years the emphasis has been changing. New subject matter, such as the real number line, number systems and number theory investigations, has supplemented the consolidation of basic arithmetic and measurement from the primary school. The increasing availability of low-cost electronic calculators in secondary schools has led to much debate about objectives in computation. This book discusses the priorities and expectations which teachers must take into account as they re-assess their approach to the teaching of number at secondary level. As with each of the other books in the series, it is written in a very clear and readable way.

N.B. Items 19.1–19.5 are the work of the project 'The Mathematics Curriculum: a Critical Review' (SEN 21:12, 36:13).

These books will be of particular value to teacher trainers, though they could also be read with profit and enjoyment by all those concerned with the teaching of mathematics at secondary level. The remaining 3 publications arising fromt he work of the Project are due to be available in the first half of 1979.

19.6 **Proof in Mathematics ('if', 'then', and 'perhaps')**, published by the University of Keele, 1978 at £0.75.

The idea of proof is fundamental to mathematics, yet it is one that sometimes troubles even experienced teachers. Particularly since the advent of 'modern mathematics', the nature and the place of proof in school mathematics has become much less clear.

This offset-litho booklet of 130 pages has been written by a group at the Institute of Education, University of Keele. It considers the nature of mathematical proof, and the text is illuminated by a very large number of examples, the average difficulty level being roughly that of Sixth Form work. While it will be read with profit and enjoyment by any teacher of secondary mathematics, it should prove particularly well-suited for use in teacher education.

The booklet, is available post free from F. R. Watson, Senior Lecturer in Education, Institute of Education, University of Keele, Keele, Staffordshire, ST5 5BG.

19.7 **The 3rd R: Towards a Numerate Society**, edited by J. A. Glenn, published by Harper and Row, 1978 at £3.95 cloth and £1.95 Pbk.

One of the most remarkable features of mathematics education is the way in which the same issues are under discussion all over the world. Among these issues, basic numeracy predominates. Have standards of arithmetic fallen

in recent years? Should employers expect school-leavers to have the same computational skills as they assert were the possession of earlier generations? More fundamentally, what are the essentials of "numeracy" for a citizen in the 1980s and beyond?

This book tackles a theme which generates strong feelings. It was prepared by members of the Mathematical Education Section of the National Association of Teachers in Further and Higher Education, a professional body concerned largely with the education of teachers of mathematics in Colleges of Education, Polytechnics and other Institutes of Higher Education.

The book is a model of objectivity and lucidity. The authors and editor state that they did not wish it to "read like an instruction book for teaching arithmetic". Nevertheless, it analyses the essentials of teaching arithmetic, particularly at primary school level, and in this respect admirably complements the publication of the Mathematics Curriculum Project "Number" also reviewed in this issue. "The 3rd R" is full of sound teaching strategies and could be valuable to any primary school teacher. At the same time it is written in straightforward, non-technical language. Critical employers and concerned paretns alike will find here a reasoned consideration both of what numeracy means, and how it may be achieved. Although the particular context is British, the principles are much more widely applicable.

19.8 **Computer Studies, Book 1**, 2nd edition, published by ICL/CES, 1978.

Details of the ICL/CES Computer Education in Schools Project were given in SEN 31.10. The Computer Studies Book 1 has been updated and rewritten, for publication in October 1978.

The ground covered is much the same as before, the central theme being that people are part of any computer system. This is illustrated with more detailed case studies, as well as reference to recent developments in computer technology.

The ICL Instructional Computer Language CESIL has been outstandingly successful as a first introduction to programming in schools; in this revised book it is used extensively to illustrate simple computing concepts. An introduction to BASIC as a simple problem-solving language is also included.

Full details are available from ICL-CES, 60 Portman Road, Reading, Berks.

19.9 **Computer Educational Aids and Resources for Teachers** published by NCAVAE, at £1.05.

This useful reference book has been prepared by the Resources Working Party of the British Computer Society Schools Committee. It lists available materials for teachers concerned with computer education at any school level. Materials covered include books, films, slides, filmstrips, wall charts, film loops, logic tutors, simulated games, teaching packages and OHP transparencies. British examination boards offering papers in computer studies are listed, as are relevant periodicals and useful addresses.

Available from: The National Committee for Audio-Visual Aids in Education, 254 Belsize Road, London NW6 4BY.

19.10 **Studies in Science Education Vol. 5** edited by David Layton, published by Centre for Studies in Science Education, University of Leeds, 1978 at £3.00.

This fifth volume contains a number of articles which deal in some depth with the applications of current psychological theories to science education. The contents form an invaluable selection of discussion and description for any graduate desirous of updating his knowledge in a field of study which is both complex and having serious applications to the way in which science is taught.

The following articles are of particular interest.

1. "An alternative to piagetian psychology for science and mathematics education" by Joseph D. Novak, Cornell University N.Y.

The author provides a tight summary of his interpretation of David Ausubel's Assimilation Theory of Learning and compares this view of factors relevant to cognitive development with Piaget's developmental psychology. Studies of the performance of Piagetian tasks are critically analysed, particularly from the aspect of enhancement of performance.

The data lead to the proposition that models of cognitive development are not stage dependent but depend more on a framework of concepts and integrations acquired during the life span of the individual.

2. "Epistemology and science education" by E. R. Cawthorn and J. A. Rowell, University of Adelaide, S. Australia.

This article reflects on an argument that the incognitant organisation and propagation of subject matter knowledge separate from thought processes, value systems etc. generates difficulties from the epistemological viewpoint. School science is said to generate an image of science which is empirical and deductive based on experimental evidence. It is not value free, generating a model of the scientist and his world which is austere and orderly.

Popper's theories by contrast generate ideas about the influential blundering of discoveries by scientists inexorably towards a rational structure of objective reality. Knowledge at a particular time is provisional and the community are the ultimate corrective influence and there is a method in apparently random discovery which is described in the article.

Kuhn emphasises even more the revolutionary process whereby old theories are rejected and replaced by a new incompatible theory.

Traditional epistemology has assumed objectivity, where there have been in fact, human attempts to construct reality structures which reflect the subjective attitudes and values of human agents.

Kuhn's paradigms and Piaget's stage development are related as paradigm shifts, familiar concepts have a meaning in a particular context only. However Kuhn is looking at thought development in communities, whereas Piaget is looking at cognitive development in individuals. The acquisition of knowledge is a complicated socio psychological business, proceeding in stages with short intervals. Man constructs concepts which cannot be separated from human agents.

It is concluded that epistemology and methodology cannot be separated and the curriculum developer can make a profound difference to the presentation of science and the image of the scientist in society.

3. "Pupils and Paradigms: A Review" by R. Driver, University of Leeds and J. Easley University of Illinois.

Normative studies indicate the difficulty adolescent pupils have in understanding concepts central to the physical sciences and developmental studies indicate the need to consider progress in understanding over long periods of time which has implications for curriculum design and teaching.

It is suggested that Piaget's accounts of children's thinking in the causality studies should be read for the indications they give of the content of children's ideas and explorations rather than as ways of assessing the development of underlying logical structures. In using Piagetian tasks assessing pupils development in science, they are most useful in discovering the ways in which the student is thinking, for the use of the teacher and curriculum developer. They arouse awareness of pupil perspectives e.g. preconceptions may persist despite instruction. We may search for trends and patterns in development but it is important not to overlook the essential individuality of learning.

Other articles in the current volume are:

"Breadth, Depth and Excellence" by R. Macleod and R. Moseley

"The Lawrence Hall of Science" by R. Karplus.

"Analysis of Science Curricula for Piagetian Level of Demand" by M. Shayer.

and several review articles.

19.11 Quest – 'A Magazine of Science, Technology and Your Environment"

The 6th edition of this lively magazine for secondary school pupils is devoted to field trips. It aims to give its readers an idea of what can be done on field trips; and, perhaps more importantly, why.

A stream study and a quarry visit are described. Other items include field study in the town; pollution; people versus cars; and the effect of a new by-pass on the life of a town.

Previous issues of "Quest" have featured biorhythms, weather forecasting, nuclear power, artificial intelligence and cybernetics, and space exploration.

Teachers' notes are available with every issue of "Quest", to enable the magazine to be exploited in the classroom.

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"Quest" is published 6 times a year; 2 issues are produced in September, 2 in January, and 2 in April.

Further information is available from the publishers, Mary Glasgow Publications Ltd, 140 Kensington Church Street, London W8 4BN.

19.12 **Physics Education, vol 13.**

The journal "Physics Education" is publishing a series of articles on alternative sources of energy. These will aim to inform the physics teacher on the finite nature of fossil-fuel reserves, and on the alternatives which might be available.

So far, there have been articles on: Offshore Wind Energy Systems (Vol 13 No 4, May 1978), Tides as an Alternative Energy Source (Vol 13 No 5, July 1978) and Aspects of Solar Technology (Vol 13 No 5, July 1978).

"Physics Education" is published 7 times a year by the Institute of Physics, 27 Belgrave Square, London SW1X 8QX.

19.13 **School Science Laboratories,** by Archenhold W. F. et al. published by J. Murray, 1978 at £6.50

Many books of this type are merely catalogues of information on safety, equipment etc. The virtue of this book is that it deals specifically with the everyday problems facing the science teacher and his technician. It offers advice on how the teacher can use the laboratory more efficiently to improve the science teaching.

There is very comprehensive coverage of all aspects of school science laboratories: design, safety, equipment, lab-reagents and biological techniques. A part from the details provided in the text, each chapter has a very extensive bibliography of books and journal articles which teachers will find very useful.

The chapters dealing with apparatus are outstanding. One chapter deals with the commercial apparatus available. It offers an evaluation of different versions available commercially and advice on repair, maintenance and efficient use of the items. A second chapter is concerned with improvisation of apparatus – how teachers and student can produce "home-made" versions, use of "odds and ends". Further ideas can be gained from the references which include many School Science Review articles from practising science teachers.

A part from general advice and information for all science teachers, there are two chapters specifically for the biology teacher and technician. One chapter deals with the culture and maintenance of living organisations. The other with biological techniques. It is a pity that the additional problems faced by biology teachers in tropical countries was not mentioned in detail. Nevertheless, both chapters are well done and students as well as teachers could learn a good deal from them.

I would recommend this book as a "must" for all science departments in U.K. and overseas. It could make a good course book for laboratory technicians' courses in technical colleges and polytechnics.

19.14 **BP Educational Service Publications**

1. *"Introducing Energy – a tape/slide presentation".* This tape/slide package is intended to be the first of three audio-visual presentations on energy. The first item consists of [illegible] full frame colour film strip with audio cassette and commentary notes. To keep prices low, and allow maxi[illegible]xibility, a set of slide mounts has been included so that teachers may prepare their own mounted slides. Two simple viewers have also been included and the contents are presented in a neat box.

The series has been developed in consultation with teachers for use with 11–15 years age range but may also serve as a simple introduction to the subject for other groups. The price of the pack in Britain is £3.78 inclusive and overseas prices will be supplied on request to the address given below.

2. *"Our Industry Petroleum".* BP has published a new edition of the handbook Our Industry Petroleum, consisting of 600 pages of text with numerous colour and black and white illustrations. It is primarily intended for those people concerned with the oil industry as a career but can also be used as a source of instruction and reference for senior personnel who are already working within oil and oil-related businesses.

The 24 chapters written by specialists include such titles as The Structure of the Industry, Finance, People in the Industry, The Environment and the Industr[illegible]Petroleum Exploration and Development. The price of the new edition is £7.50 inclusive in Britain. Overseas enquiries to the address given below.

3. *"Industry at Work:* a case study of the acetic acid process."

Again a new handbook Industry at Work has been developed to provide case study material for both secondary and tertiary level syllabuses which place stress on petrochemicals and their manufacture. The handbook deals mainly with the manufacture of acetic acid by the direct air oxidation of naphtha. Its purpose is to help students of chemistry and other disciplines to gain a better understanding of how the chemical industry operates and its role in society.

It concentrates on one specific process showing its development from the laboratory, through the pilot plant, to full scale production. The use of case studies in chemistry courses is promoted by efforts in curriculum development aimed at illustrating the complex interrelationships which exist between science, technology, society, the environment, economics and planning control.

The inclusive cost in Britain is £0.75.

Overseas enquiries about these various presentations should be directed to BP Educational Service, PO Box 5, Thorp Arch Trading Estate, Wetherby, West Yorkshire, LS23 7EH, England.

19.15 **Teaching Statistics**

A new journal for teachers, Teaching Statistics, is being launched in January 1979 with the backing of the *Applied Probability Trust,* the *Institute of Statisticians,* the *International Statistical Institute* and the *Royal Statistical Society.*

The journal seeks to help teachers of geography, biology, the sciences, social science, economics etc. to see how statistical ideas can illuminate their work and to make proper use of statistics in their teaching. It also seeks to help those who are teaching statistics and mathematics with statistics courses. The emphasis of the articles is on teaching and the classroom at all school levels. The aim is to inform, entertain, encourage and enlighten all who use statistics in their teaching or who teach statistics.

The first 4000 copies of the first issue are being given free on request. The annual subscription rate overseas will be £3 or U.S. $6.

For the free copy and details of subscription write to the Editor, Peter Holmes, Department of Probability and Statistics, University of Sheffield, Sheffield S10 2TN.

INTERNATIONAL ACTIVITIES

20. FIRST AUSTRALASIAN MATHEMATICAL CONVENTION, Christchurch, New Zealand, 15–19 May 1978.

The Australian Mathematical Society was founded in 1956, and the New Zealand Mathematical Society in 1974. Each has held annual meetings in its own country. This year, for the first time,it was decided that they would combine to mount an international mathematical convention. The Convention also included various other groups in New Zealand, including the New Zealand Mathematics Colloquium, the New Zealand Mathematical Associations (a network of regional bodies which bring together the university mathematicians and secondary school mathematics teachers), and the Operations Research Society of New Zealand.

The large majority of the participants were mathematicians and mathematics educators from New Zealand and from Australia. Invited speakers and participants also came from France, Japan, Papua New Guinea, Fiji, Canada, the United States, and Britain.

The Convention consisted of two parallel five-day programmes, one concerning mathematics at university level, the other secondary school mathematics teaching. Within each, there were two, three, or four simultaneous sessions, varying in length from half to one hour. There was a daily lecture to the whole Convention by an invited speaker from outside the Australasian region.

There were four British speakers: Professor J. M. Hammersley (Trinity College Oxford), Professor D. V. Lindley (University College London) Mr C. P. Ormell (University of Reading, Director of the Schools Council Project "Mathematics Applicable"), and Mr. B. J. Wilson (British Council).

Major themes to emerge during the Convention included the individualisation of mathematics teaching, the involvement of teachers in curriculum development, and women in mathematics. An important outcome of the Convention was the formation of the New Zealand Mathematics Teachers Association.

21. THE AUSTRALIAN MATHEMATICS COMPETITION

Mathematics competitions at school level are becoming increasingly widespread in many parts of the world. The Australian Mathematics Competition started in 1976. Numbers of candidates have grown very rapidly, reaching 60,000 in 1978.

The Competition caters for all six years of secondary education. There are three different question papers, each spanning two school years. A few questions may be common to two, or even three, of the papers. All questions are five-option multiple-choice, and are marked on the basis of a penalty being incurred for wrong answers.

An unusual feature of the Competition is that each entrant competes only against students in his own school year, in his own State. Forty-five per cent of all entrants get an award; the top fifteen per cent get Distinction Certificates, the next thirty per cent Credit Certificates.

The entry fee is 50 cents per student. The total cost of running the Competition is approximately A.$ half million, the Bank of New South Wales being a generous sponsor.

Further details of the Competition are available from Mr P. O'Halloran, Canberra College of Advanced Education, Canberra, Australia.

22. 4TH ICME

The 4th International Conference on Mathematical Education will take place in the United States. The dates and venue have recently been announced as August 11–16, 1980, at the University of California, Berkeley.

Preparations for the conference are the responsibility of the United States Commission on Mathematical Instruction, under the Chairmanship of Professor Shirley Hill.

The United Kingdom contribution to the Congress will be prepared by a working group under the Chairmanship of Professor H. Halberstam, who is the UK delegate to ICMI. This working group will report to the Mathematical Education Committee of the Royal Society, and its work will also be reported to the British National Committee for Mathematics.

23. THE 20TH INTERNATIONAL MATHEMATICAL OLYMPIAD (SEN 35.27)

The 20th International Mathematical Olympiad took place in Bucharest, Rumania, in July 1978. 17 countries participated.

The leading teams scores were:

Rumania	237	United Kingdom	201
USA	225	Vietnam	200

The most successful British participant was R. E. Borcherds, of King Edward's School, Birmingham, who gained 39 out of a possible maximum of 40 points. Only one participant, from USA, gained full marks.

It is expected that an announcement about the venue of the 1979 IMO will be made in the next issue of SEN.

24. INTERNATIONAL STUDY GROUP ON THE RELATIONS BETWEEN THE HISTORY AND THE PEDAGOGY OF MATHEMATICS

At the 1972 ICME Congress, held in Exeter, England, there was a working group (EWG11) concerned with the relations between the history and the teaching of mathematics. The activities of this group were continued at the 1976 ICME Congress in Karlsruhe under the co-Chairmanship of Processor P. S. Jones (University of Michigan, USA)

and R. J. K. Stowasser (University of Bielefeld, Federal Republic of Germany). The Executive Committee of ICMI has now approved the affiliation of this study group under a title "International Study Group on Relations between History and Pedagogy of Mathematics, Co-operating with the International Commission of Mathematical Instruction".

The principal aims of this study group are:

1. to promote international contacts and exchange information about
   (a) courses in the history of mathematics in universities, colleges and schools;
   (b) the use and relevance of the history of mathematics in mathematics teaching;
   (c) views on the relation between the history of mathematics and mathematics education at all levels;
2. promote and stimulate interdisciplinary investigation by bringing together all those interested, particularly mathematicians, historians of mathematics, teachers, social scientists and other users of mathematics;
3. to further a deeper understanding of the way in which mathematics evolves, and the forces which contributes to this evolution;
4. to relate the teaching of mathematics and the history of mathematics teaching to the development of mathematics in ways which assist the improvement of instruction and the development of curricula;
5. to produce materials which can be used by teachers of mathematics to provide perspectives and to further the critical discussion of the teaching of mathematics;
6. to facilitate access to materials in the history of mathematics and related areas;
7. to promote awareness of the relevance of the history of mathematics for mathematics teaching;
8. to promote awareness of the history of mathematics as a significant part of the development of cultures.

Anyone interested in the activities of this group is asked to contact: Leo F. Rogers, Secretary, International Study Group on Relations between History and Pedagogy of Mathematics, Digby Stuart College, Roehampton Institute of Higher Education, London SW15 5PH.

25. SOUTH EAST ASIAN CONFERENCE ON MATHEMATICAL EDUCATION

The first South East Asian Conference on Mathematical Education took place from 29 May to 3 June 1978 at the International Convention Centre, Manila, Philippines.

The Conference was organised by the Mathematical Society of the Philippines, with the assistance of the Philippines government, the International Commission on Mathematical Instruction, the South East Asian Mathematical Society, and the Mathematics Teachers Association of the Philippines.

The objectives of the Conference were:

1. to provide a regional forum for the presentation of the results of studies made on
   (a) the type of mathematics programmes currently offered at all levels;
   (b) the type of mathematics programmes that should be and could be offered so as to meet the goals of the developing countries of South East Asia;
   (c) the training and upgrading of mathematics teachers.
2. To explore ways of making the problems of mathematics education known to the public and to governments so as to obtain needed support.
3. To explore methods of regional co-operation in mathematics education and research.

Participants were drawn from many countries of the Asian region, with visitors from outside the region.

Further information on the outcomes of the Conference may be obtained from: Fr. Bienvenido F Nebres, S J, Dean, The Graduate School and College of Arts and Sciences, Ateneo de Manila University, Manila, Philippines.

26. THE SOUTH EAST ASIAN MATHEMATICAL SOCIETY (SEAMS)

SEAMS was founded in 1972. Since then it has organised or helped to organise about 20 regional and national mathematics conferences, symposia and workshops. The objectives behind its first activities were to provide opportunities for mathematicians in the South East Asia area to meet and know one another, to discuss and to seek solutions to common problems and to share their experiences and successes. SEAMS has now reached the stage where it can sponsor workships and seminars in specialised areas of mathematics. Its biggest undertaking to date has been convening the First South East Asian Conference on Mathematical Education (see item 25).

The Society publishes a quarterly Newsletter and semi-annual Bulletin which is mainly devoted to expository and survey articles, research problems, research announcements, reviews and abstracts, and papers on mathematical education.

Future plans include the setting up of a network of mathematical centres in the region, with one centre in each member country, and a Regional Co-ordinating Centre. With French assistance, a Franco-South East Asian Mathematical Conference will be mounted in 1979.

Further information may be obtained from the President of the Society, Fr. Bienvenido F. Nebres, S J, Dean, The Graduate School and College of Arts and Sciences, Ateneo de Manila University, Manila, Philippines.

27. ICME SYMPOSIUM ON THE EDUCATION OF MATHEMATICS TEACHERS

The International Congress of Mathematicians met in Helsinki, August 15–23, 1978.

The main work of the Congress concerned mathematics at university level. Included in the programme was a symposium on mathematics education, which took as its theme "What Knowledge, Experience and Understanding of Mathematics should a Mathematics Teacher Have?". It is hoped to include a report of the outcomes of this symposium in the next edition of this Newsletter.

28. 5th INTER-AMERICAN CONFERENCE ON MATHEMATICAL INSTRUCTION

The Interamerican Committee on Mathematical Instruction is pleased to announce that the 5th Interamerican Conference on Mathematical Instruction will take place from the 13th to the 16th of February, 1979 in the city of Campinas, Sao Paulo State, Brazil. Campinas is located approximately 50 miles Northwest of the city of Sao Paulo. It has close to 500,000 inhabitants, is a major industrial centre, and has two Universities. February is summer in Campinas and the temperature is warm. The conference will take place two weeks before the traditional Carnival festivities.

The 5th CIAEM Conference will consist of lectures, round table and panel discussions on mathematics education problems on all levels in all countries of the continent. There will be opportunities for the presentation of papers and projects by individual participants.

Papers will be presented mainly in Portuguese and Spanish, though English and French will also be official languages of the meeting.

Details about the programme and about registration and accommodation may be obtained from: 5th CIAEM, Cidade Universitaria – UNICAMP, Caixa Postal, 6063, 13.100 Campinas–SP, Brazil.

29. OXFORD CONFERENCE: THE ROLE OF THE LABORATORY IN PHYSICS EDUCATION.
Clarendon Laboratory Oxford 14–21 July 1978

This conference was organised by ICPE and GIREP with support and assistance from UNESCO and the British Council. Over 150 delegates attended during a period of a week. There were a wide variety of countries represented, ranging from the European situation, the Americas, Japan and several Commonwealth countries.

The proceedings of the conference were quite diverse and included the presentation of key discussion papers, the origination of discussion groups, the provision of exhibitions and book displays and social events for those who were not participating in the actual conference itself.

Some of the interesting papers which were presented included the following:

'Teaching laboratories in a developing country', M. Hussain, Bangladesh

'Laboratory work in developing countries' by Dr T. O. Aro, Nigeria

'Who needs laboratories' by PE Richmond, University of Southampton

'The assessment of experimental work for understanding basic insights' by Karl Hecht of the University of Keele

'School physics laboratory work in the Philippines' by Dr V. M. Talisayon

'The assessment of experimental physics' by Dr C. Cook, Westfield College

'The teaching of electronics by the construction of practical devices' by Robert H. McMickle, Turkey

'Educational projects at undergraduate level in Mexico' by G. Alegria et al of Mexico.

There were several other presentations, in addition to these papers, which are selected from the section of the conference dealing with practical work.

The British Council provided a reception for overseas visitors and contributed to the book displays and an exhibition of low-cost equipment. These provoked a wide degree of interest which led to discussion in the informal groups throughout the conference.

The proceedings of the conference will now be edited by Mr J. Lewis of Malvern College, Worcester with the intention of providing a publication at a later date.

30. CHEMICAL EDUCATION IN DEVELOPING COUNTRIES – IUPAC SURVEY

The latest IUPAC International Newsletter on chemical education (No 8) published the results of a survey of chemical education in developing countries. A detailed questionnaire was sent to about 35 developing countries with the aim of obtaining information on the status of chemistry and chemical education, nature of problems and areas where international co-operation and collaboration are desirable. Twenty three countries returned the questionnaire ranging from India, with a population of 600 m, 400 000 chemists (15,000 with PhDs) and 10,000,000 chemistry students at high school level, to Fiji, with a population of 0.57 m, 170 chemists (10 with PhDs) and 4000 chemistry students at high school.

A number of countries have been involved in examination reforms. In India, Indonesia, Nigeria and Fiji, objective type examinations, periodic evaluation and the use of item banks have been introduced at school level. In Sri Lanka, a new system of examinations has been developed to replace GCE. In Malaysia and Uganda O level exams have been modified to suit local needs.

The main problems facing chemical education at school level seem to be common to all countries. They are: shortage of trained teachers, lack of preparedness of the students; over-crowded classrooms; shortage of books and resource materials; lack of trained laboratory assistants; lack of laboratory equipment; formal teaching of chemistry is too remote from everyday life; increasing cost of everything that is needed; absence of teacher motivation.

The Newsletter is available from Dr M. Robinson, The Chemical Society, Burlington House, London W1.

31. INTERNATIONAL CONFERENCE: TEACHING OF CHEMISTRY – THE INTERFACE AND INTERACTION BETWEEN THE SECONDARY AND TERTIARY LEVELS, DUBLIN, 27–31 AUGUST 1979

This meeting, sponsored by the IUPAC Committee on Teaching Chemistry, the Federation of European Chemical Societies, the Royal Irish Academy and the Institute of Chemistry of Ireland, will be held at Trinity College, Dublin. Further details are available from Dr Malcolm Robinson, the Chemical Society, Burlington House, London W1V 0BN.

32. ONTARIO SCIENCE CENTRE

This centre, opened in 1969 is designed as a museum of Science and Technology in which the exhibits are to be used by the visitor. They illustrate the effect of science and technology on man's life and environment. The Centre consists of three buildings, one of which contains services, and the other two the exhibition halls, workshops, laboratories, theatres and control rooms.

There are over 500 exhibits, one hundred of which have audio-visual input. Many take the form of games or contests in which the visitor tests his perception or ability against a machine.

There are arrangements for educational visits, theatre presentations, demonstrations and workshops.

33. GIREP MEETING 1979

The next GIREP (International Group for the Advancement of Physics Teaching) meeting will be held from August 19th–August 25th, 1979 at the Weizmann Institute of Science, Rehovot, Israel.

The main topics are:

Oscillations and waves (at school and university levels), and

Current problems in physics teaching (culturally deprived students, mixed ability, social aspects).

For further information please contact: Dr Hanna Goldring, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel.

34. PORTUGAL: "PACKAGING USEFUL TO SCHOOLS" CAMPAIGN

This campaign resulted in the release of 22 million units of educational material suitable for use in primary schools, in the packaging of a number of widely used commercial products such as washing powder, toothpaste and sweets.

The way in which it was conducted was usual and deserves explanation. The idea was proposed by José Francisco Nereu who was working in the Directorate of Basic Education. It was included in the programme of the Ministry of Education and Scientific Research.

An appeal was made through press, radio and television for support from business firms. A voluntary committee co-ordinated the response. Ideas were received for the teaching aids needed by the least well equipped primary schools. These were linked with the offers of commercial firms to take part in the scheme, and consultation with their advertising agencies and marketing executives followed. Prototypes were approved by the Ministry and the firm concerned authorised to use the campaign's symbol on the packaged product.

The materials which appeared included detachable letters, punctuation marks, and mathematical signs, maps, rulers, protractors, clock faces and compass cards, a miniature marionette theatre and strip cartoons on the history of common fruits. In some cases several manufacturers co-operated in the production of one project.

The public were asked to give packaging materials with the campaign symbol on them to the nearest school or administrative office, to be passed to the schools.

The results of the campaign have not been evaluated as the Ministry has been unable to continue its support but it would appear to be a very useful pattern for others to develop.

35. SOUTH AFRICA: NATIONAL SCIENCE EDUCATION WORKSHOP: 10–12 July 1978

The aim of this Workshop held in the University of Cape Town was to review the role and function of science in South African school education, both at primary and secondary level. The initiative and the organisation of the Workshop was taken by the South African Association of Teachers of Physical Science and was prompted by the fact that a further revision of the physical science syllabus is about to take place in South Africa.

There were about 60 participants chosen so as to involve all the major groups concerned with science education in South Africa. Thus there were science education planners and inspectors from the various education departments of the provinces and of the various sectors of education (coloured, Indian and black), representatives of university chemistry and physics departments, practising teachers, teachers from both provincial and private schools, representatives of industry, and representatives from a variety of national bodies such as the Department of Planning, the Unit for Future Research at the University of Stellenbosch, the Human Sciences Research Council and the Council for Scientific and Industrial Research.

The 3 day Workshop began with a number of general lectures to provide a framework for the subsequent discussions. These lectures were concerned with "General trends in South Africa to the year 2000" by a speaker from the Unit for Future Research at the University of Stellenbosch, "Manpower Projections for South Africa to the year 2000" by a speaker from the Human Resources Laboratory of the Chamber of Mines, "World Trends in Science Education" by the Director of Schools & Further Education Department of the British Council, "The Present Structure of Science Education in South Africa" and "A Report on the Human Sciences Research Council Investigation into Science Education in South Africa". These general lectures were followed by a number of Workshops in which the participants were divided into groups of about 8 for discussing specific aspects of science education. The Workshop was opened by Dr A. P. Burger, the Prime Minister's Scientific Adviser; it was chaired by Dr L. Alberts, Director-General, National Institute for Metallurgy.

A number of recommendations were put forward by the working groups and endorsed by the conference at the final plenary session. It was agreed that these would be submitted for appropriate follow-up action by the various bodies concerned with coordinating curriculum development activities and science in South Africa. A report of the conference will be published.

36. ISRAEL: SEMINAR ON CURRICULUM IMPLEMENTATION AND ITS RELATIONSHIP TO CURRICULUM DEVELOPMENT IN SCIENCE

The Bat Sheva de Rothschild Foundation for the Advancement of Science in Israel sponsored a Seminar on Curriculum Implementation from 23 July to 2 August 1978. The Seminar was organised by the Amos de-Shalit Science Teaching Centre, Israel and was held in part at the Weizmann Institute of Science, Rehovot and in part at the Hebrew University, Jerusalem. The Seminar Chairman was Dr P. Tamir.

The Seminar attracted about 40 participants from countries other than Israel and about an equal number from Israel itself. All the foreign participants had had some direct experience in implementation of curricula particularly in science and most had been specially invited by the organisers.

The Seminar consisted of a number of plenary lectures followed by discussion groups on various aspects of curriculum implementation. Among the topics considered were the problems of diffusion of curriculum innovation and the various aspects of curriculum implementation including politics, evaluation and relationship to the needs of society. Many of the principal speakers referred to specific case studies of curriculum implementation and thus reference was made to most of the major curriculum projects in science which have been developed over the last 10 years or so. There was an exhibition of curriculum materials illustrating some of the projects being developed in Israel.

37. COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME): AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1977/78

We regret that the results of the 1977/78 CASME competition are not yet available. We hope to announce them in the next issue of the Newsletter.

38. COMMONWEALTH ASSOCIATION OF SCIENCE AND MATHEMATICS EDUCATORS (CASME): AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS 1978/79

1. Introduction

The purpose of these awards is to encourage teachers in schools and colleges with particular reference to developing countries of the Commonwealth in the teaching of science and mathematics.

In recent years there has been an emphasis on social aspects of science and mathematics teaching and it is hoped that entries will continue to reflect this trend. Emphasis should also be given to the relevance of science and mathematics curricula to local needs and conditions and to the impact of technology and agriculture on the local community.

2. Countries involved

The following Commonwealth countries have been involved in the scheme in recent years:

Associated States of the Eastern Caribbean, Barbados, Belize, Botswana, Britain, Cyprus, Ghana, Guyana, Hong Kong, Jamaica, Kenya, Lesotho, Malawi, Malaysia, Malta, Nigeria, Sierra Leone, Singapore, Swaziland, Tanzania, Trinidad and Tobago, Uganda, Zambia.

The organisers would be happy to receive entries from other countries as well.

Full details are given below of the arrangements for the 1978/79 competition.

3. Topics for the Competition

Awards will be made on the basis of reports submitted to the Judges relating to the following aspects of science and mathematics education:

- the development of teaching materials aimed at introducing pupils to the broad field of social impact of science and mathematics.

Aspects of science and mathematics education suggested as suitable for consideration are:

- the development of curricula and syllabuses;
- the design and production of teaching materials to meet special needs;
- investigation of the learning process in relation to study and teaching;
- the planning, equipment, provision and use of laboratory facilities, including resourceful solutions to meeting needs in circumstances of limited facilities;
- a science exhibition contribution;
- language and the teaching of science and mathematics.

These subject areas will remain as broad outlines within which new materials may be developed and under which entries may be submitted, but in each entry the relationship of the work carried out, to its social context and its impact on the nation, community or individual must be made clear.

It is intended that the topic of the entry should be based on personal experience and should include a substantial account of teaching and/or other education work actually carried out on the suggested lines.

In recent years, award-winning entries have covered the following topics:–

A detailed ecological study of a given area;

Water pollution;

Industrial education terminology;

Concept of noise pollution;

Description of a schools science exhibition;

Motivation of children's interests in the learning of Magnetism;

The influence of culture on the learning and teaching of science in an area;

The planning, equipment provision and use of laboratory facilities;

Project work and Teacher Education.

4. Awards

Awards to the total value of £300 will be made according to the decision of the Judges. This sum will be generously provided by the Commonwealth Association of Science and Mathematics Educators. The right is reserved to refrain from awarding a first prize if the Judges advise that no candidate has submitted an entry worthy of the award. In the event of no first prize being awarded the prize money may be divided in whatever manner appears equable in the light of the Judges' recommendations. The decisions of the Judges will be final and no correspondence will be entered into concerning their decision.

5. Categories of Entrants

Entries are invited from teachers in primary, secondary or tertiary education institutions.

Entries may be submitted by either individuals or syndicates (eg the science staff of a school or college, or a partnership of teachers from more than one institution).

6. Presentation of Entry

Only one entry can be accepted from any one entrant or syndicate.

The entry must be written or typed on one side of quarto sheets of paper. Reports should not exceed 10,000 words in length and normally might be expected to be of the order of 2,000–5,000 words.

Photographs and other illustrative material should be included wherever relevant, together with any other evidence that shows the ideas have been effective in practice. Such evidence should include the work of pupils whenever possible.

Reference should be made to the source of information or of original experiments wherever this is necessary to a proper assessment of the proposed modifications. If any substantial part of an entry is being published or submitted as a thesis, this should be mentioned on the top sheet of the entry.

The Judges will pay more attention to evidence of original thought and ingenious application than to mere bulk. Moreover, as stated in paragraph 3, the report should be based on personal experience and work which has been actually tried out long enough to provide some evidence of its value.

7. **Dates**

Registration must be made before 31 December 1978.

Entries from officially registered candidates must arrive in Schools and Further Education Department of the British Council before 1 March 1979.

The Awards will be announced in the summer or autumn of 1979.

8. **Treatment of the Selected Topics:**

The Judges will be glad to consider any reasonable treatment of the selected topics provided it is based on personal, or team, experience and it includes a substantial account of teaching and/or education work actually carried out relevant to the topic. The CASME Awards Scheme is intended to reward original teaching carried out for long enough to enable a reasonable assessment of it to be made. Entries which are only suggested schemes, new programmes or revised syllabuses which have not been tried out will not be considered. Judges may return an entry for submission at a later date if it shows promise but has been submitted prematurely.

The following may be of help to intending entrants. While these may provide guidelines for the construction of an entry, it is not suggested that this is the only form of submission:

An account should be given of:

- the background to the work;
- the particular difficulties or problems which were to be solved, or other reasons for the work;
- the thinking (principle) on which action was based;
- what action was taken and how it was carried out;
- reactions and results;
- further action to be taken or rethinking.

Application for Registration must be made before the date given in paragraph 7 above.

Intending applicants should therefore apply early for registration forms to:

1. Your local British Council office or
2. CASME Awards, c/o Schools and Further Education Department, the British Council, 10 Spring Gardens, London SW1A 2BN.

9. **Please note that reports submitted must be the entrant's own original work, and should not have been published to date.**

REGISTRATION FORM

THE CASME AWARDS FOR SCIENCE AND MATHEMATICS TEACHERS

Administered

a. locally by: Your local British Council office

b. in London by: CASME Awards
Schools and Further Education Department
The British Council
10 Spring Gardens
London SW1A 2BN

PLEASE READ THIS CAREFULLY BEFORE COMPLETING THE FORM

A Registration Form must be completed and received by the above Administrator by **31 December 1978.**

As acknowledgement of receipt of the Registration Form you will receive a 'Top Sheet' giving you a Registration number. You must submit this Top Sheet with your entry and the number will be your identification. Please do not add your name and address as the number will identify you. Please also use this number in any correspondence.

If your address given beneath changes between completing this form and the notification of the Awards **please advise** the London address above.

In the case of a syndicate entry please list, on a separate paper, the names, qualifications, teacher experience and present position of all members.

---

1. Name of entrant or syndicate nominee (Block letters with Surname underlined) .....

2. Address for Correspondence .....
.....
.....
.....

3. Name of School or College .....

4. Brief title and outline of proposed entry .....
.....
.....
.....

5. Qualifications, with dates (eg degree, teachers certificate) .....
.....

6. Brief record of teaching service and present position .....
.....
.....
.....

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7. I have/have not* previously submitted an entry for the Guiness Award or CASME Awards Scheme.

8. If you have, please give details .....

9. This entry has/has not* been submitted for consideration in other competitions.

If so, please give details .....

.....

*Delete parts which are not applicable.

10. I certify that this entry is my (in the case of a syndicate entry, our) own original work, and that it has not been published to date.

Signed..... Date.....

DISPOSAL OF ENTRY

A. If the entry receives an Award, first publication rights are thereby assigned to CASME.

Signed..... Date.....

B. If the entry does not receive an Award, please return the entry to me/or CASME may retain the entry with first publication rights.*

Signed..... Date.....

*Delete part which is not applicable

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Where a number of references are given, those referring to key articles are in bold type.

An asterisk indicates that the article is concerned mainly with publications (eg of the project referred to). References to journals, monographs, reports, etc, will be found under PUBLICATIONS.

References to British Curriculum Development projects will be found under the following main references:

MATHEMATICS (TEACHING) PROJECTS
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References to Overseas Curriculum Development Projects will be found mainly under individual countries and major agencies, eg UNESCO.

Back copies of issues 28, 31 and 33–36 only are available. Photocopies of important articles can be made available if necessary. Applications for back copies of SEN, etc. should be made through the local British Council office, or to Schools and Further Education Department in London.

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